

Using NGS Online Positioning User Service (OPUS)

Ken Bays
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Introduction

Online Positioning User Service (OPUS) allows users to submit their RINEX (**R**eceiver **I**ndependent **E**xchange) format GPS data files online to the National Geodetic Survey (NGS), where the data will be processed to determine a position using NGS computers and software. Each RINEX file that is submitted will be processed with respect to 3 [National CORS](#) sites. The resulting position is automatically e-mailed back to the user. You do not need software for baseline processing or least squares adjustment software on your computer. You only need to download the file from your GPS receiver, convert to RINEX format, and submit online to NGS.

I **do not** recommend OPUS for positioning multiple points that are close together on a project, because error propagated from the distant CORS base stations will be apparent when you try to measure directly between the stations on your project.

OPUS is a **viable option** for performing GCDB ties to one point on a survey project, and I do recommend OPUS for that purpose. One operator with one dual-frequency GPS receiver can complete the GPS tie.

NGS requires a **minimum** of two hours of data per file, but recommends at least four hours of data. I recommend doing **two three-hour sessions** at your remote station, breaking down your tripod and setting up again between sessions in order to achieve an independent occupation and an independent antenna height measurement. NGS requires that you use a **dual-frequency** GPS receiver.

You must download the files from the GPS receiver, convert the file to RINEX format, and then submit the RINEX file to NGS via the OPUS on-line submittal form.

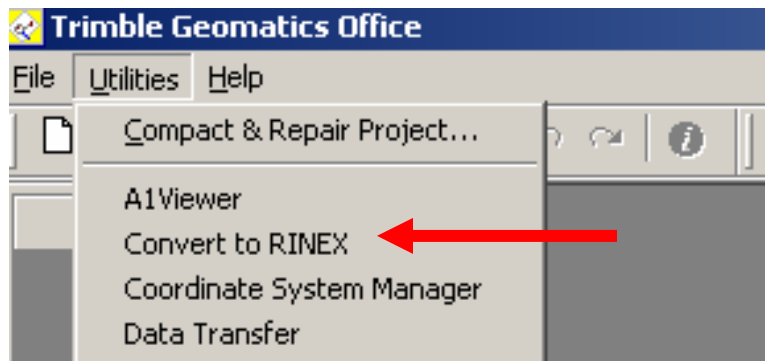
The following instructions assume a Trimble .dat file and Trimble Geomatics Office (TGO) software; however, the executable for “Convert to RINEX” in TGO is “**dat2rinw.exe**”, which can be run as a stand alone program without TGO.

Dat2rinw.exe is typically located in:

C:\Program Files\Common Files\Trimble\DatToRinex\dat2rinw.exe.

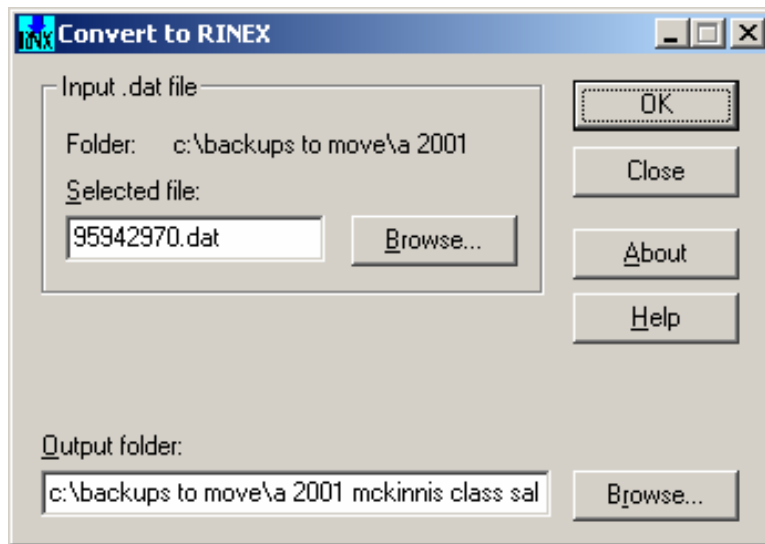
Converting the downloaded Trimble .dat file to a RINEX file in TGO.

1. Using Trimble Geomatics Office (TGO), with all projects closed; pick “**Convert to RINEX**” from the “**Utilities**” menu.

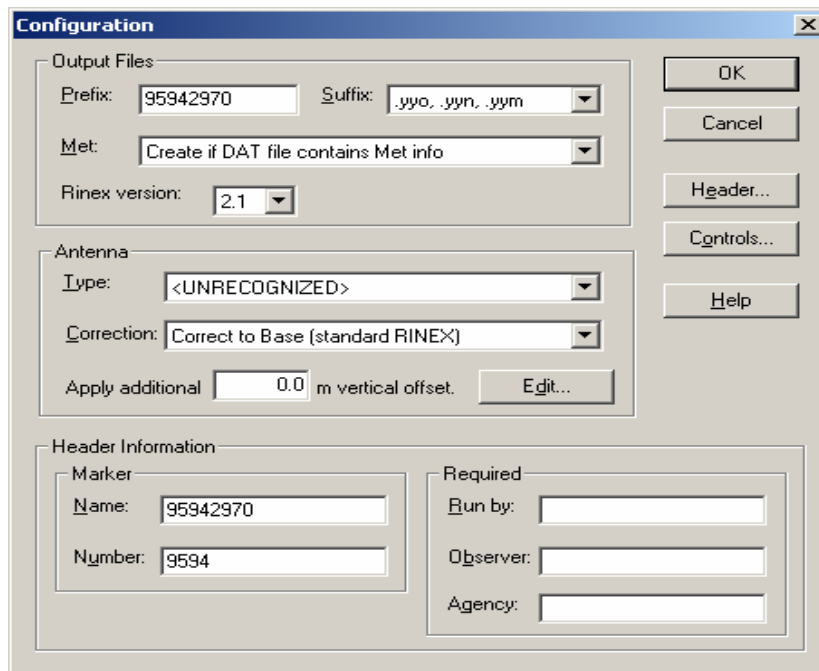


2. In the “**Convert to RINEX**” window, browse to the .dat file you want to convert to RINEX.

Also, in the “**Convert to RINEX**” window, browse to the output folder where you want to send the RINEX file, then click “**OK**”.



3. This will open the “**Configuration**” window shown below:



4. In the “**Configuration**” window under “**Output Files**”, it is recommended to change the “**Prefix**” to AAAAJJJX, where AAAA is a four character station name, JJJ is the Julian day, and X is the session number during that Julian day.

Set the “**Suffix**” to “.yyo,.yyn,.yym”

Set the “**Met**” to “Create if DAT file contains Met info”, or “Do not create.”

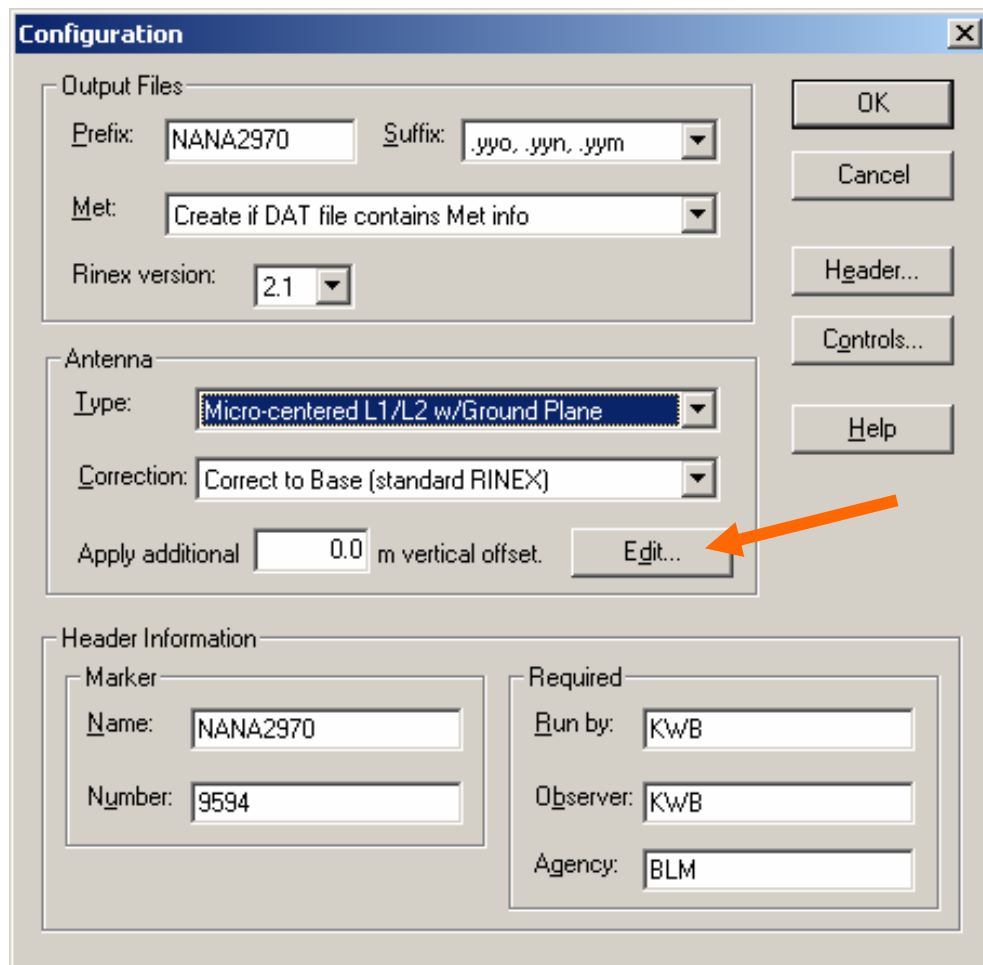
Under “**Antenna/Type**”, use the pull-down menu to choose the correct antenna that you used.

Under “**Antenna/Correction**” choose “**Correct to Base (standard RINEX)**”. This corrects the antenna height measurement to the antenna reference point (**ARP**) of the antenna.

Under “**Header Information**” change the “**Name**” to the same as what you put for the output file prefix.

Fill in the “**Required**” info for who the RINEX conversion “**Run by**”, who the GPS “**Observer**” was, and the “**Agency**” of the observer.

When finished, click ‘**EDIT**’ in the ‘**Antenna**’ portion of the window.



The screenshot shows a 'Configuration' dialog box with three main sections: 'Output Files', 'Antenna', and 'Header Information'. The 'Output Files' section includes fields for 'Prefix' (NANA2970), 'Suffix' (.yyo, .yyh, .yyr), 'Met' (Create if DAT file contains Met info), and 'Rinex version' (2.1). The 'Antenna' section includes a 'Type' dropdown (Micro-centered L1/L2 w/Ground Plane), a 'Correction' dropdown (Correct to Base (standard RINEX)), and an 'Apply additional' field (0.0 m vertical offset) with an 'Edit...' button. The 'Header Information' section is divided into 'Marker' (Name: NANA2970, Number: 9594) and 'Required' (Run by: KWB, Observer: KWB, Agency: BLM) fields. On the right side, there are buttons for 'OK', 'Cancel', 'Header...', 'Controls...', and 'Help'. An orange arrow points to the 'Edit...' button in the 'Antenna' section.

5. In the “**Edit Antenna Height**” window, choose the “**Measurement Method**” that you used for measuring your antenna height in the field, in this example, “Bottom of Notch on Ground Plane”.

Enter “**Original antenna height**”, as measured in the field, and then click “**Correct**”.

Occupation 1 of 1

Marker name: 95942970

Measurement method:
Bottom of notch on ground plane

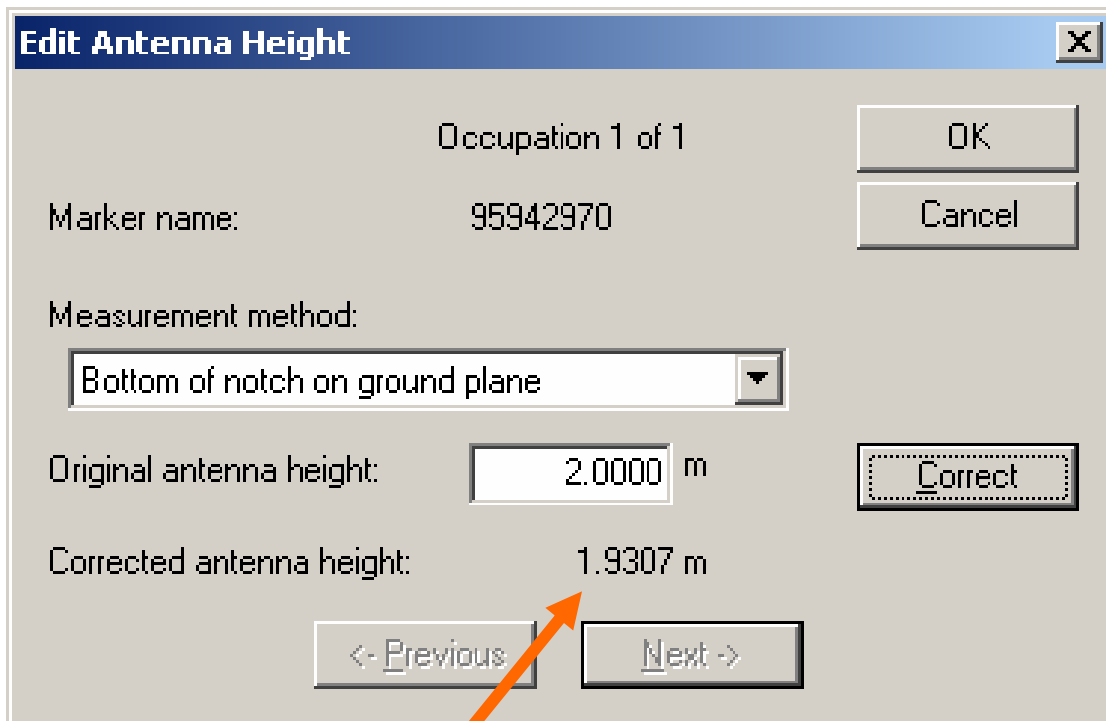
Original antenna height: 2.0000 m

Corrected antenna height: 0.0000 m

<- Previous Next ->

OK
Cancel
Correct

5. The “**Corrected antenna height**” will be computed:



Occupation 1 of 1

Marker name: 95942970

Measurement method: Bottom of notch on ground plane

Original antenna height: 2.0000 m

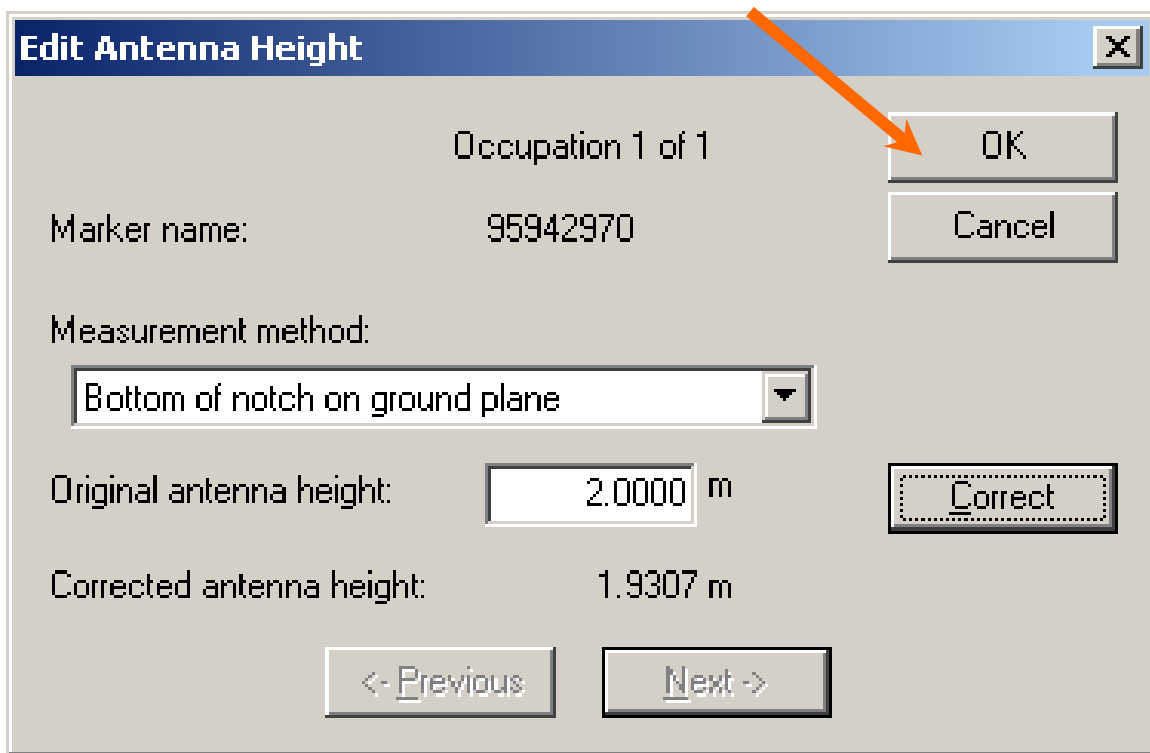
Corrected antenna height: 1.9307 m

<- Previous Next ->

OK Cancel Correct

Write this “Corrected Antenna Height” down. You will need this number to enter as the “Antenna Height” when you submit the RINEX file on-line to NGS. It is the vertical measurement, not the slant measurement, from the survey mark to the Antenna Reference Point (ARP), which is almost always the center of the bottom-most, permanently attached portion of the antenna. Although this antenna and height information will be in the RINEX file you create, **OPUS does not read the header of the RINEX file for antenna or height information. You need to manually enter the corrected antenna height into the on-line submission form for OPUS.**

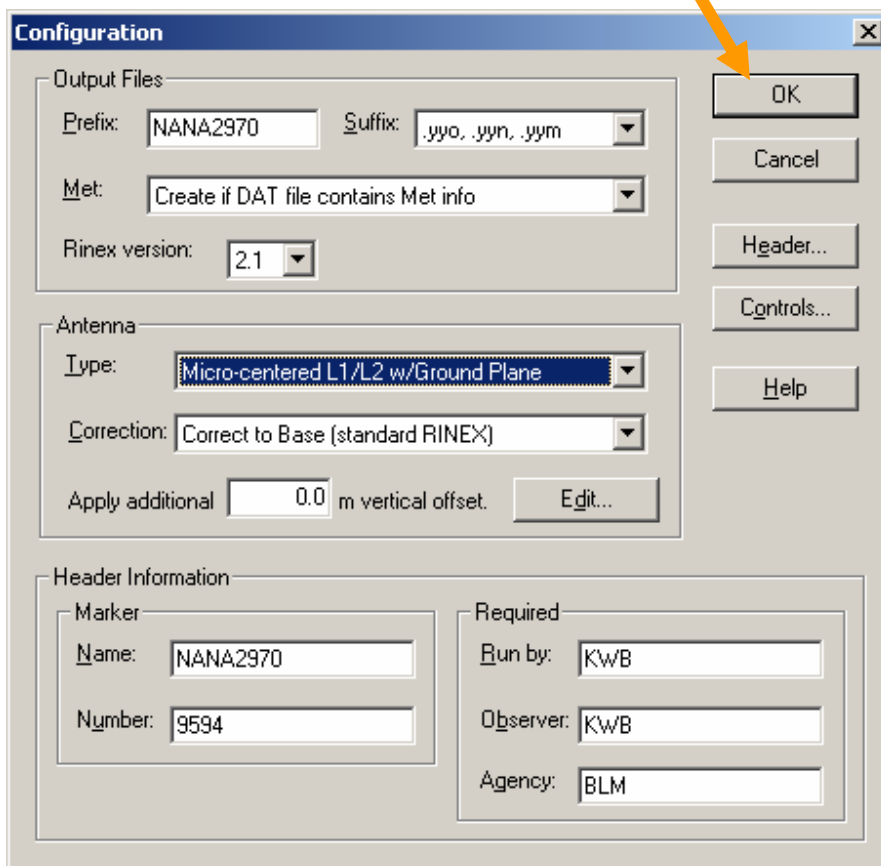
8. In the “Edit Antenna Height” window, click “OK”



The "Edit Antenna Height" dialog box is shown. It has a title bar with a close button (X). The main area contains the following fields and buttons:

- Occupation 1 of 1
- Marker name: 95942970
- Measurement method: Bottom of notch on ground plane (dropdown menu)
- Original antenna height: 2.0000 m
- Corrected antenna height: 1.9307 m
- Buttons: OK, Cancel, Correct, < Previous, Next >

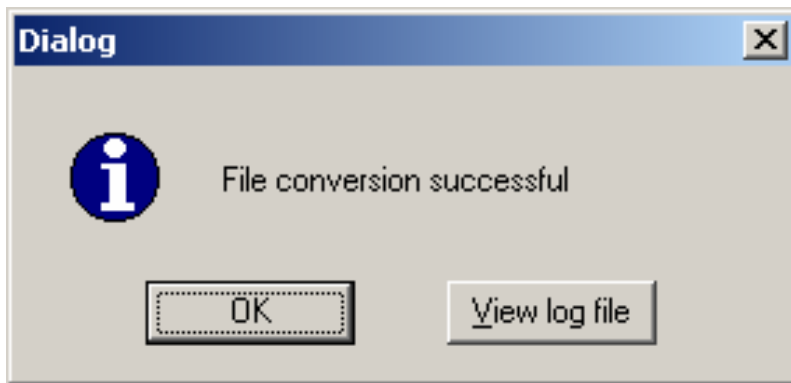
9. In the “Configuration” window, click “OK”



The "Configuration" dialog box is shown. It has a title bar with a close button (X). The main area contains the following fields and buttons:

- Output Files:
 - Prefix: NANA2970
 - Suffix: .yyo, .yyr, .yyr (dropdown menu)
 - Met: Create if DAT file contains Met info (dropdown menu)
 - Rinex version: 2.1 (dropdown menu)
- Antenna:
 - Type: Micro-centered L1/L2 w/Ground Plane (dropdown menu)
 - Correction: Correct to Base (standard RINEX) (dropdown menu)
 - Apply additional 0.0 m vertical offset. Edit...
- Header Information:
 - Marker:
 - Name: NANA2970
 - Number: 9594
 - Required:
 - Run by: KWB
 - Observer: KWB
 - Agency: BLM
- Buttons: OK, Cancel, Header..., Controls..., Help

10. You should get the message below if your conversion is successful.



Two RINEX files are created, an **observation file** with the file extension having the 2 digit year and the letter "o" (oh), e.g., site3650.99o , and a navigation file with the extension having the 2 digit year and an "n", e.g. site3650.99n . You only need to submit the observation file to OPUS.

OPUS allows users to submit compressed GPS data (.ZIP, .zip, .Z, .gz) as well as uncompressed GPS data, so you may wish to zip your RINEX file before submittal to OPUS. If you are pkzipping your file, the "archive" name must have the same name as the rinex file that it contains. For example, **site3650.99o.zip** must contain file **site3650.99o** only.

Submitting the RINEX File to NGS:

1. Using a browser, go to URL: <http://www.ngs.noaa.gov/OPUS/index.html>
2. Complete the on-line submittal form as follows:
 1. Your E-mail address.
 2. Browse to the RINEX **observation file** .yyo that you created. OPUS allows users to submit compressed GPS data (.ZIP, .zip, .Z, .gz) as well as uncompressed GPS data. If you are pkzipping your file, the "archive" name must have the same name as the rinex file that it contains. For example, **site3650.99o.zip** must contain file **site3650.99o** only.
 3. Choose your antenna type from the pull-down menu. The pick list has the description and part numbers of Trimble dual frequency antennas, so check the part number on your antenna.
 4. Enter the **Corrected Antenna Height** that you wrote down above when converting to RINEX. This is the vertical measurement to the Antenna Reference Point (ARP). You must supply this vertical measurement because OPUS does not read the header of the RINEX for antenna or height information.
 5. Optionally, choose State Plane Coordinate output if you want them in addition to geographic and UTM coordinates.
 6. Let OPUS automatically choose the 3 base stations, or optionally pick them yourself. If you "Let OPUS choose", OPUS will screen the CORS base stations it uses for data availability, data quality, etc.

OPUS Home Page - Netscape

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: <http://www.ngs.noaa.gov/OPUS/index.html>

What's Related

Legant G

6 new antenna additions:
Ashtech 701975.01A

What is OPUS

OPUS Guidelines

GPS Height Measurements

Antenna Types

Output Description

Discussion

Expected Precisions

Latest Orbits

Areas Covered

FAQs

Questions - Comments

OPUS

Positioning User Service

1.
Enter your email address

2.
Enter your RINEX file **NEW!** Now accepting compressed files (.ZIP, .zip, .Z, .gz)

3.
Select the antenna type

4. meters
Enter the antenna height

5.
Optional: State Plane Coordinates

6.

NEW! Select up to 3 base stations

7.

Your data must have a minimum of 2 hours of observations!

Document: Done

Start OPUS Home Page - Net... Microsoft PowerPoint - [P... Document1 - Microsoft W... 2:07 PM

7. Once this information is complete, click the “**Upload File**” button to send your data to NGS. Your results will be emailed back to you in a few minutes. You may only upload one RINEX file at a time.

Output:

See http://www.ngs.noaa.gov/OPUS/output_descr.html for a description of the OPUS output page.

OPUS will output positions in ITRF97 and NAD83(CORS96) datums.

NOTE: NAD83(CORS96) datum is equivalent to NAD83(98) datum, the datum used for the High Accuracy GPS Reference Network (HARN) here in Oregon.

REF FRAME:	NAD83 (CORS96) (EPOCH:2002.0000)		ITRF97 (EPOCH:2000.7696)	
X:	1114072.082 (m)	0.001 (m)	1114071.482 (m)	0.028 (m)
Y:	-4837333.344 (m)	0.029 (m)	-4837331.898 (m)	0.027 (m)
Z:	3991747.164 (m)	0.012 (m)	3991747.029 (m)	0.018 (m)
LAT:	38 59 32.62230	0.028 (m)	38 59 32.65039	0.007 (m)
E LON:	282 58 10.10424	0.006 (m)	282 58 10.09343	0.022 (m)
W LON:	77 1 49.89576	0.006 (m)	77 1 49.90657	0.022 (m)
EL HGT:	137.142 (m)	0.015 (m)	135.857 (m)	0.037 (m)
ORTHO HGT:	169.081 (m)	0.029 (m)	[Geoid99 NAVD88]	
UTM:	Zone 17			
NORTHING:	4317893.798 (m)			
EASTING:	324146.573 (m)			
US NATIONAL GRID DESIGNATOR: 18SUJ4185520774 (NAD 83)				
SPC:	Zone 1900 (MD)			
NORTHING:	147162.427 (m)			
EASTING:	397355.434 (m)			